Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Wavelength dependent photoionisation of ethanol clusters: Generation of hydrogen like C^{5+} ions at terawatt laser intensity

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Electronic Supplementary Information (ESI)

1. Experimental details:

- **Details of molecular beam used to produce ethanol cluster**

  Nozzle diameter: 0.8 mm

  Pulse duration: 300 µs

  Carrier gas: Argon

  Carrier gas pressure: 2 atm

- **Details of laser pulse used in ionisation of ethanol cluster**

  Pulse duration: 30 ps

  Beam profile: Gaussian

  Beam diameter/ waist: 10 mm

  Divergence: < 0.5 mrad

Laser beam was focused with a plano-convex lens having focal length of 35 cm.

Laser pulse was interacted with the most clustered region of the gas pulse by optimizing the delay between the laser beam and the molecular beam.

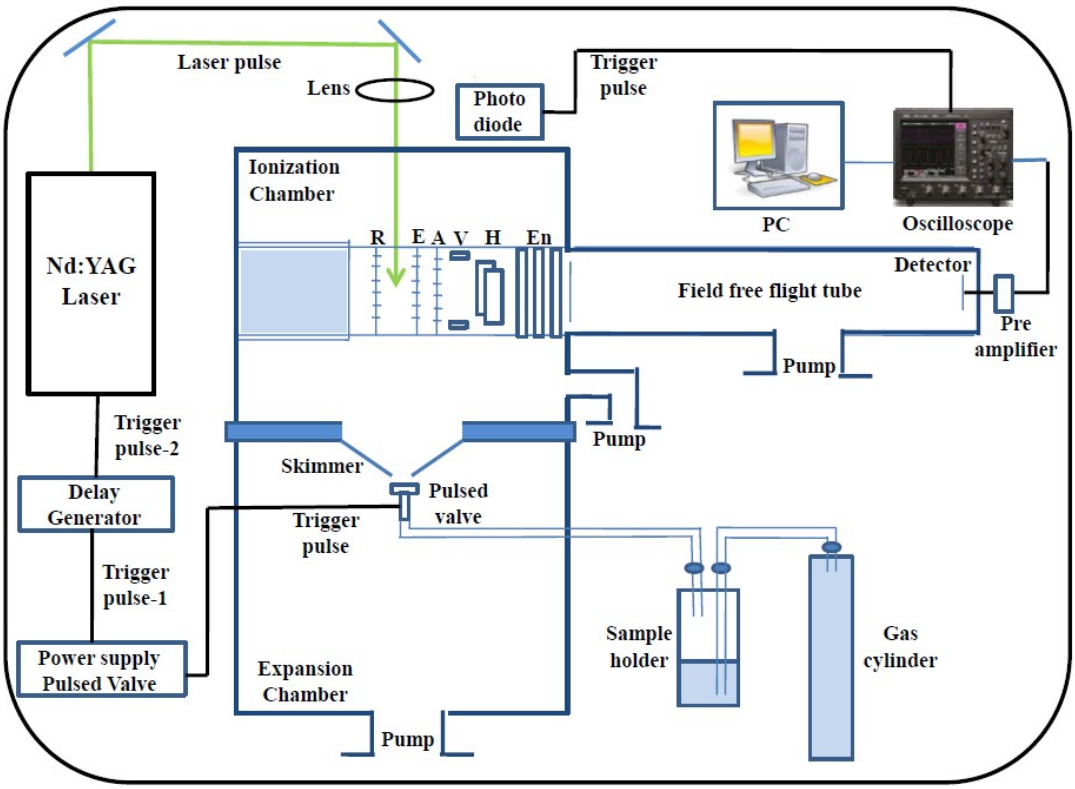

Figure S1: Experimental set-up of laser-cluster interaction study

2. Conversion of laser energy to intensity at different laser wavelength

In order to convert laser energy to intensity, laser spot size is required. To determine the radius of laser spot following standard equation has been used.

$$r = \frac{2f\lambda}{\pi D}$$

Where r, f, λ and D represents radius of laser spot, focal length, laser wavelength and beam diameter respectively.

Using the radius of laser spot, area of the laser spot can be determined at respective wavelength. Upon dividing the energy of laser pulse with area of the laser spot and pulse duration, one can determine the laser intensity for a particular laser wavelength.

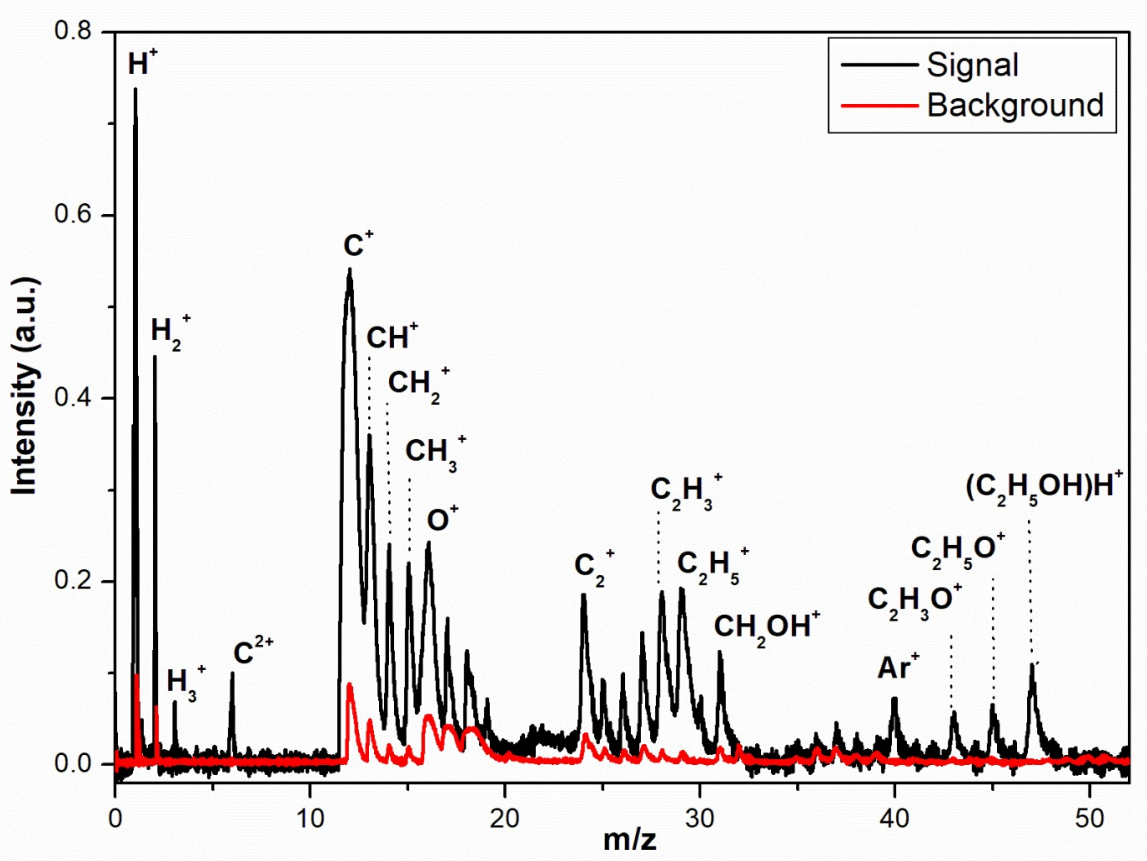

Figure S2: Time-of-flight mass spectra of ethanol clusters upon ionisation at 266 nm laser pulses of intensity 5 x 10^{12} W/cm^2. The trace in red indicates the background ionisation under similar experimental conditions.

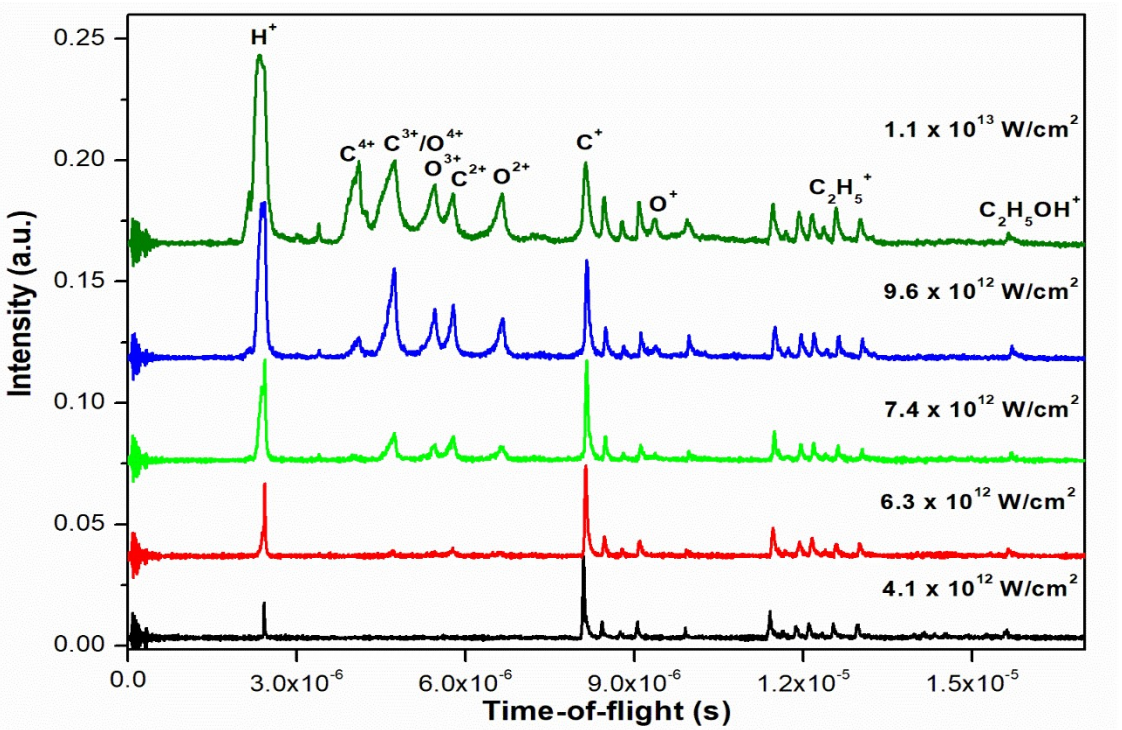

Figure S3: Time-of-flight mass spectra of ethanol clusters as a function of laser intensity at 532 nm ionisation